C003: CLOTHING AND EQUIPMENT FOR COLD WEATHER AND MOUNTAIN OPERATIONS

TSP Number/Title	C003: Clothing and Equipment for Cold Weather and Mountain Operations
Effective Date	Implement next class iteration upon receipt
Supersedes TSP(s)/Lessons	None
TSP User	The following courses use this TSP: Cold Weather Instructor Qualification Course (CWIQC) Command and Staff Orientation Course (CSOC) Cold Weather Leaders Course (CWLC) Mountain Instructor Qualification Course (MIQC) Basic Mountaineering Course (BMC) Assault Climbers Course (ACC)
Proponent	United States Army Alaska, Northern Warfare Training Center
Improvement Comments	Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to: ATTN: TRAINING ADMINISTRATOR COMMANDANT USARAK NWTC 1060 GAFFNEY ROAD #9900 FORT WAINWRIGHT AK 99703-9900
Security Clearance/Access	Public domain
Foreign Disclosure Restrictions	The Lesson Developer in coordination with the USARAK NWTC foreign disclosure authority has reviewed this lesson. This lesson is releasable to foreign military students from all requesting foreign countries with Approval of Commandant USARAK NWTC.

PREFACE

Purpose

This training support package provides the instructor with a standardized lesson plan for presenting instruction for:

Task Number	Task Title
III.0100	Clothing and Equipment for Cold Weather and Mountain Operations

Technique of Delivery

Lesson Number	Instructional Strategy	Media
C003	Platform Instruction	PowerPoint

This TSP contains

SECTION I **ADMINISTRATIVE DATA**

All courses including this lesson

Course Number(s)	Course Title (s)
	Cold Weather Instructor Qualification Course (CWIQC)
	Command and Staff Orientation Course (CSOC)
	Cold Weather Leaders Course (CWLC)
	Mountain Instructor Qualification Course (MIQC)
	Basic Mountaineering Course (BMC)
	Assault Climbers Course (ACC)

Task(s) Taught or Supported

Task Number	Task Title
III.0100	Clothing and Equipment for Cold Weather and Mountain Operations

Task(s) Reinforced

N/A

Test Lesson Number

Hours	Lesson Number	Lesson Title
1	C020 or M020	Cold Weather Written Test (Winter) or Mountain Written Test (Summer)

Prerequisite Lesson(s) **None**

References

Number	Title	Date	Additional Information
	NWTC Cold Weather Operations Manual	FY04	Updated yearly
	NWTC Mountain Operations Manual	FY04	Updated yearly
USARAK Regulation 670-1	Uniform and Insignia - Wearing of the Army Uniform for Arctic Soldiers	January 2002	https://fwa.ak.pac.army.mil/
USARAK Pamphlet 385-4	Risk Management for Cold Weather Operations	March 2004	https://fwa.ak.pac.army.mil/
CG Policy Letter #0-14	Cold Weather Physical Training Policy	December 2002	https://fwa.ak.pac.army.mil/
USARAK Pamphlet 600-2	USARAK Handbook and Standards Guide	January 2002	
FM 31-70	Basic Cold Weather Manual	1968	http://www.adtdl.army.mil/
FM 31-71	Northern Operations	1971	http://www.adtdl.army.mil/
FM 3-97.6	Mountain Operations	November 2000	http://www.adtdl.army.mil/
FM 3-97.61	Military Mountaineering	August 2002	http://www.adtdl.army.mil/
Wilkerson MD, James A.	Medicine for Mountaineering, 5th Edition		

Student Study Assignment Students should read C003

Instructor Requirements	MIQC or CWIQC graduate; TAITC graduate
Additional Support Personnel Requirements	One assistant to run PowerPoint slide show.
Equipment Required	Computer with proxima capable of running PowerPoint presentations.
Materials Required	Instructor Materials: Platform Guidebook for C003; Student Materials: NWTC Mountain or Cold Weather Operations Handbook
Classroom, Training Area and Range Requirements	Classroom
Ammunition Requirements	None
Instructional Guidance	Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.

Branch Safety Manager Approval

NAME	Rank	Position	Date
Mark Gilbertson	**GS-09**	**Training Specialist**	

Proponent Lesson Plan Approvals

NAME	Rank	Position	Date
Peter Smith	**GS-12**	**Training Administrator**	

SECTION II **INTRODUCTION**

Method of Instruction: Platform
Instructor to student ratio: 1:75 (maximum)
Time of instruction: 50 minutes
Media: Computer with proxima

Motivator

In January 1942, the war between Russia and Germany took a tragic turn for the German Army.

Due to a poor supply system and a lack of cold weather considerations, Germany lost 120,000 men to cold weather injuries alone.

I'm _____.

During this period of instruction you will learn the basic principles of Cold Weather Clothing and Equipment.

As a result of this instruction you will be able to properly wear and care for the clothing and equipment that you have been issued.

Being issued this additional clothing and equipment does not necessarily prevent you from becoming a cold weather casualty.

Without proper training and knowledge of how to wear and care for this equipment you can still become a victim of the elements.

Clothing and Equipment for Cold Weather and Mountain Operations

Reference NWTC Cold Weather or Mountain Operations Manual; USARAK Regulation 670-1; USARAK Pamphlet 385-4; USARAK Pamphlet 600-2; CG Policy Letter #0-14

Terminal Learning Objective

At the completion of this lesson you (student) will:

ACTION	Demonstrate knowledge of design principles, proper wear and maintenance procedures of clothing and equipment for cold weather/mountain operations
CONDITION	In a classroom environment.
STANDARD	Demonstrate knowledge of design principles, proper wear and maintenance procedures of clothing and equipment for cold weather/mountain operations IAW the NWTC Mountain or Cold Weather Operations Manual.

Safety Requirements

None

Risk Assesment Level

Low

Environmental Considerations

None

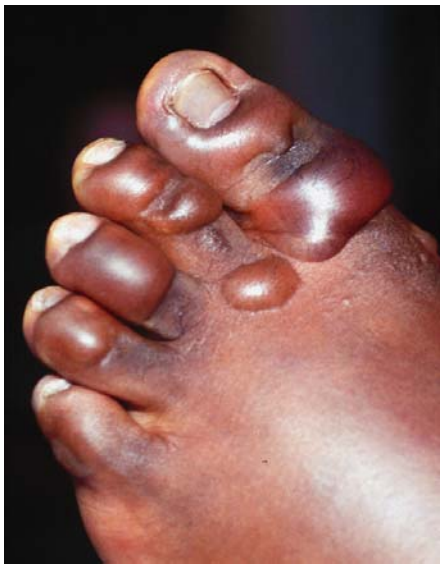
Evaluation

Students will be evaluated on the comprehension of lesson material by a written test.

Instructional Lead-in

(Slide 2) All of the injuries on the screen resulted from improper wear/use of personal clothing.

(Slide 3)



3

REV-010920

(Slide 4)

4

REV-010920

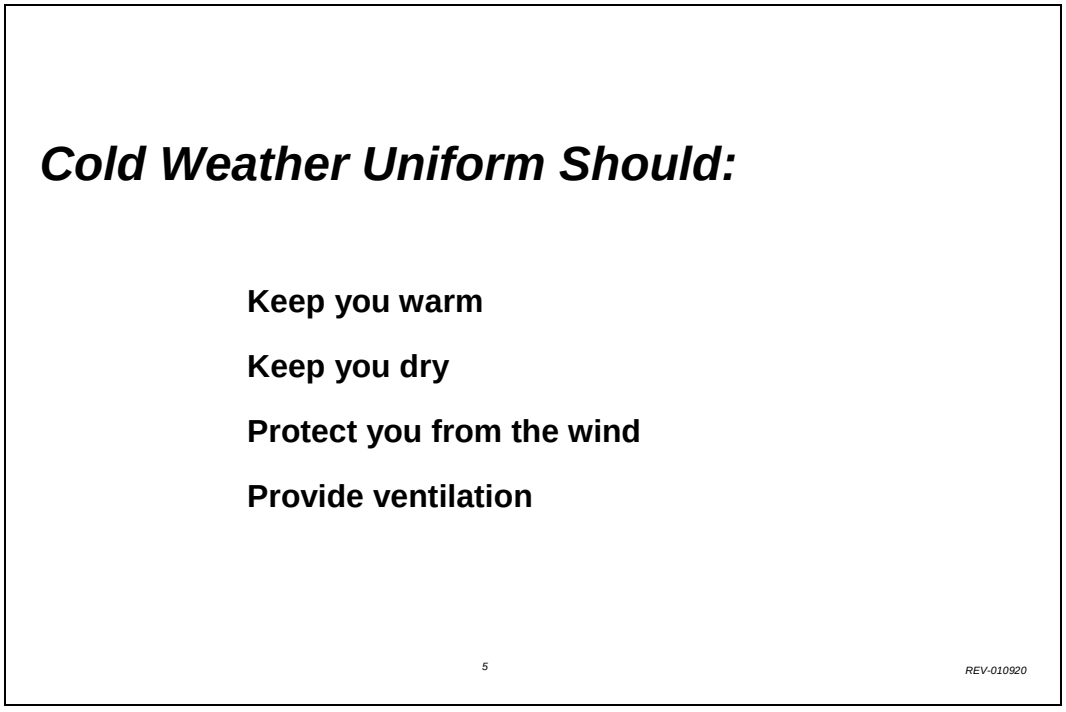
SECTION III **PRESENTATION**

ELO A

ACTION	List four things a cold weather uniform should do
CONDITION	In a classroom environment.
STANDARD	List four things a cold weather uniform should do IAW the NWTC Cold Weather or Mountain Operations Handbook

Learning Step/Activity 1 – The cold weather uniform

a. (Slide 5) A cold weather uniform should-
(1) Keep soldiers warm down to ambient temperatures of -60°F, (with moderate movement)
(2) Keep you dry
(3) Protect you from wind
(4) Provide ventilation

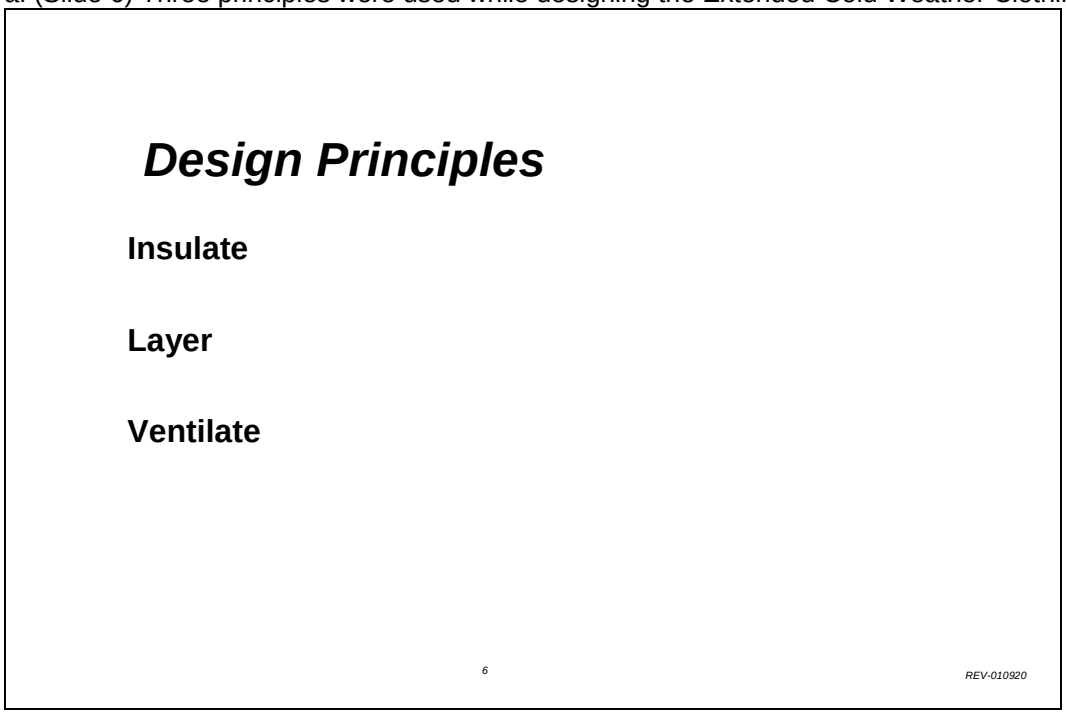


ELO B

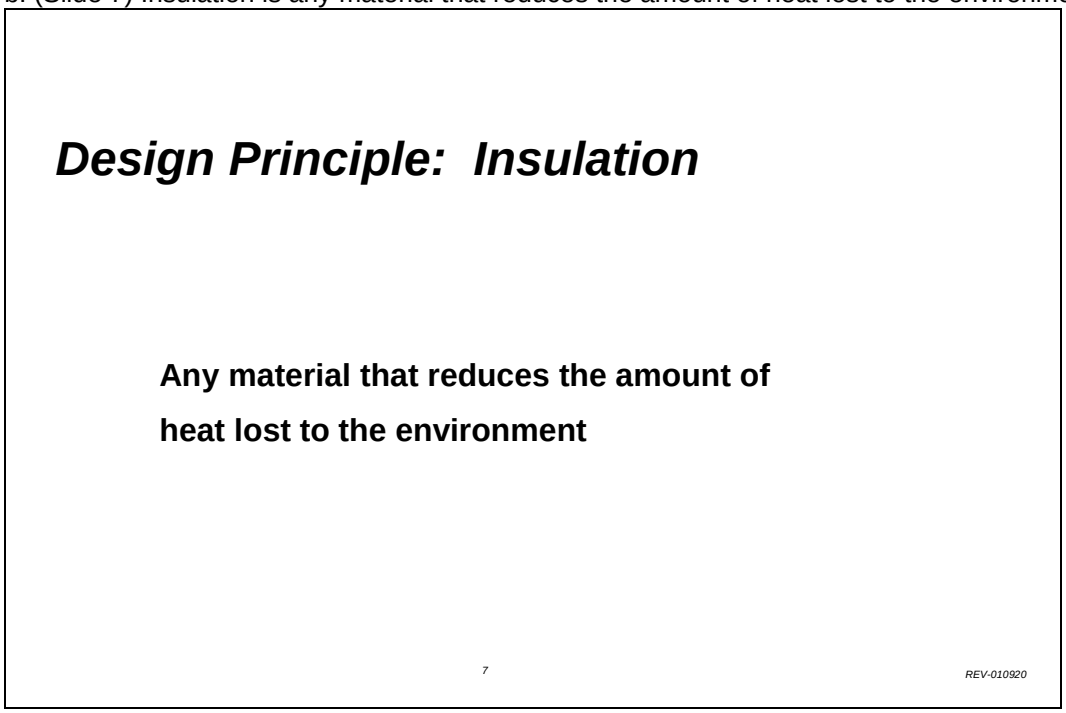
ACTION	Describe the design principles of clothing used in cold weather and mountain environments
CONDITION	In a classroom environment.
STANDARD	Describe the design principles of clothing used in cold weather and mountain environments IAW the NWTC Cold Weather or Mountain Operations Handbook

Learning Step/Activity 1 – Design principles of the ECWCS

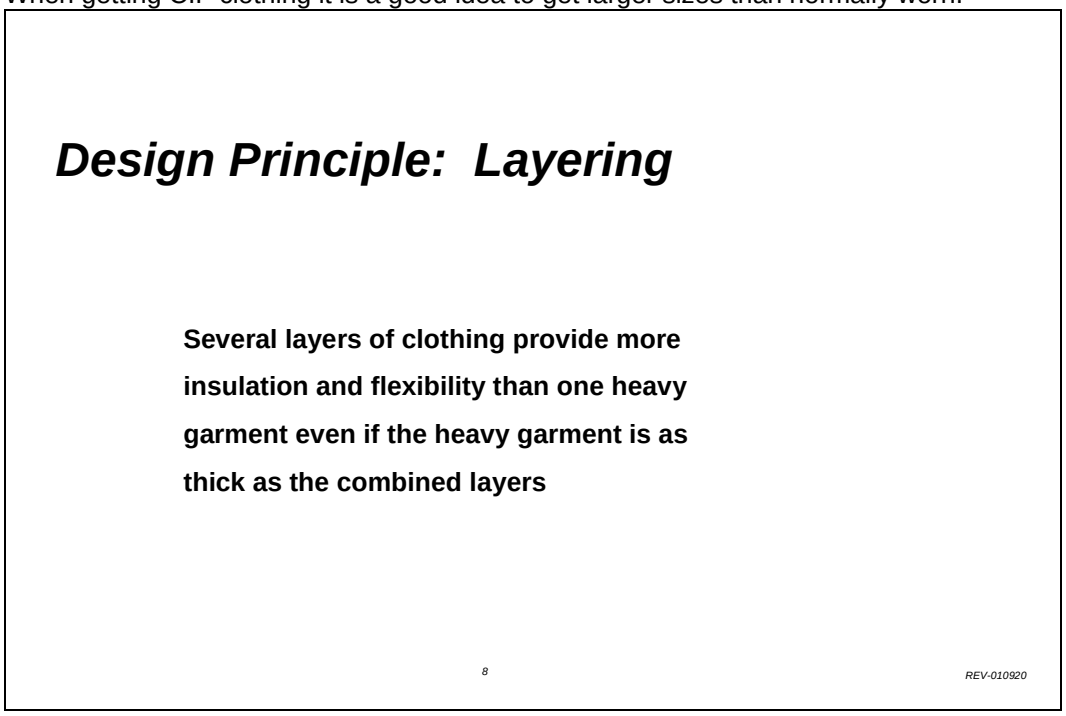
a. (Slide 6) Three principles were used while designing the Extended Cold Weather Clothing System



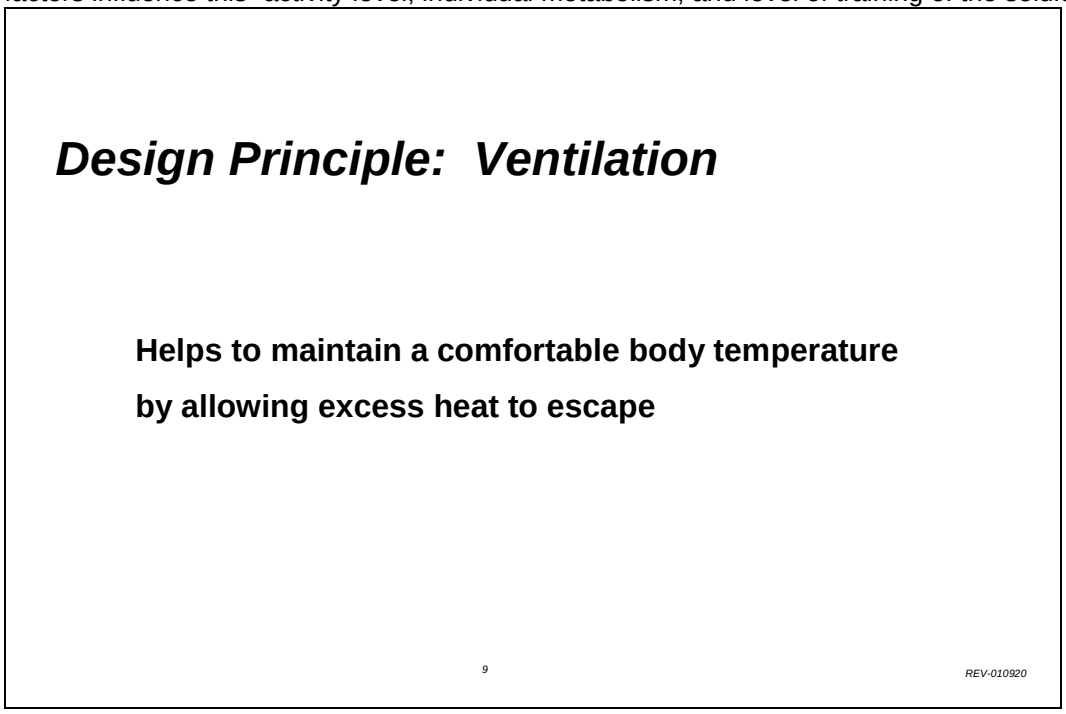
b. (Slide 7) Insulation is any material that reduces the amount of heat lost to the environment.



(Slide 8) Several loose layers are better than one heavy garment.
This produces greater insulation and adjustability. Air space is insulation.
When getting CIF clothing it is a good idea to get larger sizes than normally worn.



(Slide 9) Ventilation is a means of controlling the amount of heat retained or lost. Excess heat produces perspiration. This soaks the clothing and raises the potential for cold weather injuries. In an extreme cold environment, it is difficult to mandate a particular uniform for a given temperature. Many factors influence this- activity level, individual metabolism, and level of training of the soldier.

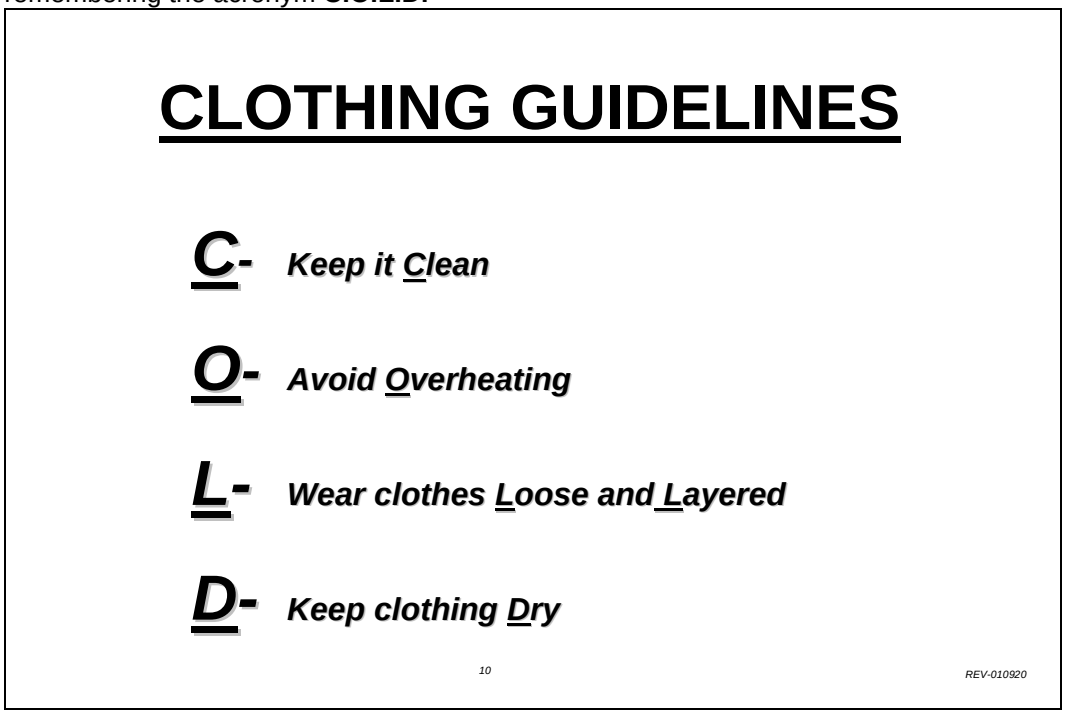


ELO C

ACTION	Explain the acronym C.O.L.D.
CONDITION	In a classroom environment.
STANDARD	Explain the acronym C.O.L.D. IAW the NWTC Cold Weather or Mountain Operations Handbook

Learning Step/Activity 1 –

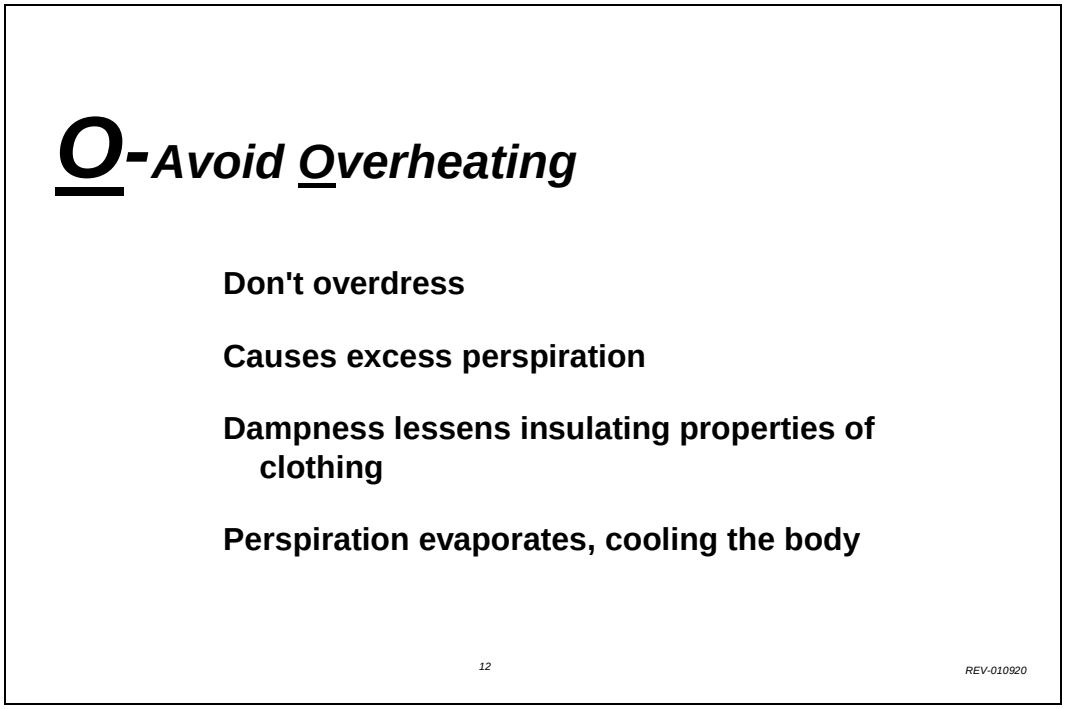
a. (Slide 10) We follow the simple clothing guidelines (insulation, layering and ventilation), by remembering the acronym **C.O.L.D.**



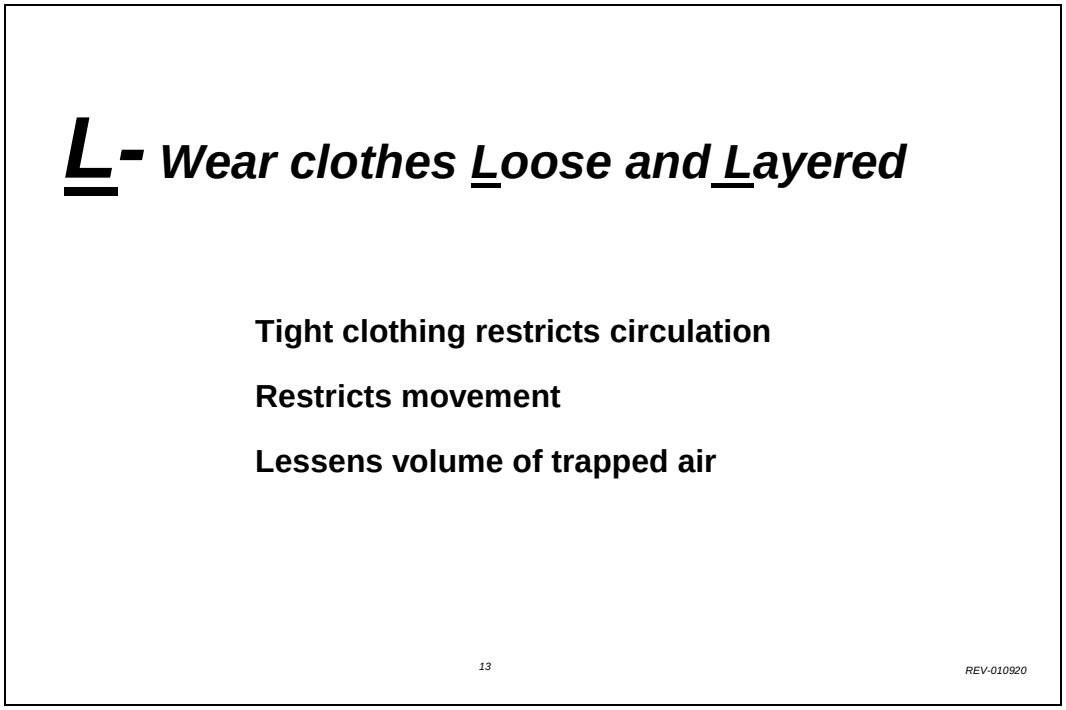
b. (Slide 11) Keep it clean

Clean clothes provide maximum warmth by trapping dead air warmed by the body between the pores of the fabric. Dirt and grease destroy insulating properties by blocking the pores.
Clean clothing when possible. Dry rubbing and airing when washing is not possible (demonstrate rubbing).

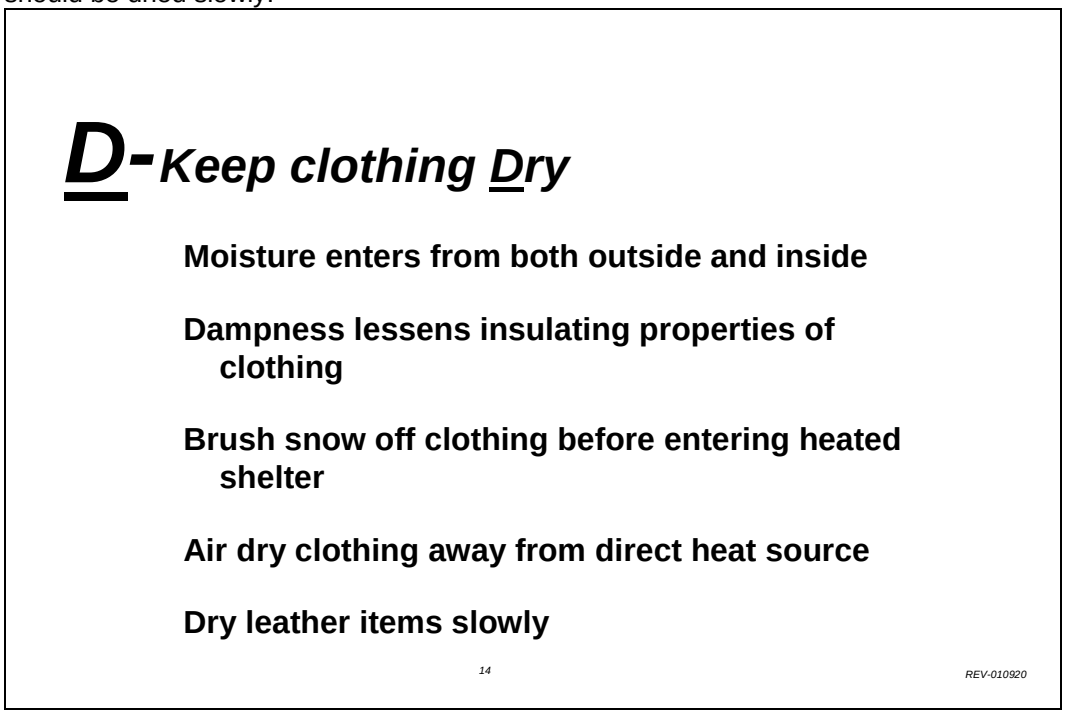
c. (Slide 12) Avoid overdressing. Overheating causes perspiration. Dampness will lesson insulating properties. Perspiration evaporates and cools the body.



d. (Slide 13) Wear it Loose and in Layers. Tight clothing- boots, gloves, hats, all restrict blood circulation. Tight garments reduce the amount of insulation (air space is insulation)
If outer garments are tight, additional layers underneath will restrict circulation.



e. (Slide 14) Keep it dry. Moisture will enter clothing from two directions:
(1) Inside- perspiration
(2) Outside- Precipitation- rain, snow, ice, frost
Moisture reduces insulation properties. Brush snow and ice off clothing before entering heated shelters
Clothing can be dried by air outside or inside heated shelters away from heat source. Leather items should be dried slowly.



ELO D		
	ACTION	Describe the ECWCS system
	CONDITION	In a classroom environment.
	STANDARD	Describe the ECWCS system IAW the NWTC Cold Weather or Mountain Operations Handbook

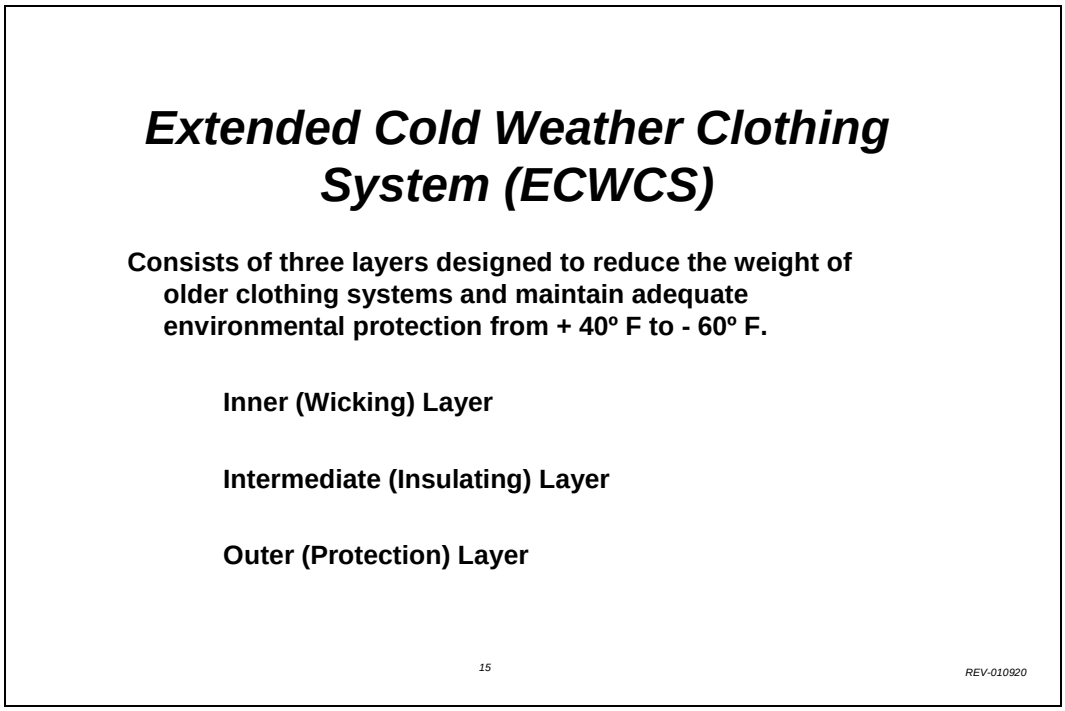
Learning Step/Activity 1 – Extended Cold Weather Clothing System (ECWCS)

a. (Slide 15) The ECWCS is an insulated, layered, clothing system designed to reduce the cumbersome weight of the older cold weather clothing systems while maintaining adequate environmental protection between +40°F and -60°F, ambient temperature. The system has distinct layers with different functions. The function of the wicking layer, or inner layer, is to wick moisture away from the body. The intermediate, or insulating layer, provides the insulating space. The outer layer, or protection layer, provides protection by virtue of being wind proof and water-resistant. A feature of the layering design of this system is the user's ability to add or remove clothing layers to suit the environmental conditions and individual personal preferences. Synthetic fibers and innovative fabrics and design allow moisture, the prime conductor of the cold to the skin, to be removed quickly and efficiently from the system. The ECWCS issue consists of the following items:

(1) Inner (Wicking) Layer-
- Polypropylene undershirt and pants with standard wool socks

(2) Intermediate (Insulating) Layer-
- Wool balaclava, and/or pile cap, and/or OR Windstopper Balaclava
- Fiber Pile Cold Weather Shirt and Bibs (Bear Suit) ***or***
- Pile Jacket (SPEAR LEP) and Medium Weight Stretch Bib Overalls (SPEAR LEP)***or***
- Liner Cold Weather Coat and Liner Cold Weather Trousers

(3) Outer (Protection) Layer-
- Extended Cold Weather parka and trousers, trigger finger mittens, arctic mittens, white vapor barrier boot or intermediate cold weather boot (ICW)



Learning Step/Activity 2 – The Inner (Wicking) Layer

a. (Slide 16) The inner or wicking layer is designed to wick moisture away from the body. Uniform tips – wearing cotton T-shirts/drawers under Polypro defeats the purpose of this garment. Sweat will be trapped close to the body and can cause chafing, and may cause the wearer to become cold from the sweat. Wear a pair of nylon shorts as an alternative to cotton underwear. Women may want to choose a sports bra as an alternative to cotton bras. A 550 cord necklace with a lighter can be worn next to the body. This allows you to keep this asset warm and at your disposal when required. Cotton socks are also a NOGO!

Heavyweight polypropylene is an issue item; lightweight and mid-weight models are available through the supply system.

ECWCS: Inner (Wicking Layer)

Designed to wick moisture away from the body.

Consists of:

Polypropylene Undershirt*

Polypropylene Drawers*

Nylon Sock - Liner Sock

Wool Sock - Insulating Sock

***Polypropylene is available in lightweight, medium weight and heavy weight (standard issue)**

16

REV-010920

Learning Step/Activity 3 – The intermediate (insulating) layer

a. (Slide 17) The insulating layer is designed to trap air providing an insulating space of air warmed by the body. The liner cold weather is the least desirable of the insulating layers, though it will serve its purpose. Avoid adding layers to the point of restricting movement. This will not keep you warmer. Leaders should avoid dictating the uniform that a soldier wears underneath the outer layer. Individual soldiers may tolerate cold very differently from one another and an overheated, sweat-soaked soldier is in just as much danger of becoming a cold weather casualty (or even a heat related injury), as an underdressed one.

ALL SOLDIERS SHOULD UNDERSTAND AND BE COMFORTABLE WITH THE DESIGN PRINCIPLES OF THE ECWCS SO THAT THEY MAY MAKE AN INFORMED DECISION ABOUT HOW TO DRESS FOR SUCCESS IN THE COLD.

ECWCS: Intermediate (Insulating) Layer

Designed to trap air, providing an insulating space of warm air

Consists of:

Liners Cold Weather - Coat

Liners Cold Weather - Trousers

17

REV-010920

b. (Slide 18) The bear suit is excellent for wear during stationary activities such as the defense, guard posts, etc., but is a poor choice for movement. It is very thick and soldiers may quickly overheat while wearing this. Leaders must give soldiers the opportunity to up dress or down dress during halts or movements.

ECWCS: Intermediate (Insulating) Layer

Designed to trap air, providing an insulating space of warm air

Consists of:

Fiberpile Cold Weather Shirt and Bibs (Bear Suit)

18

REV-010920

c. (Slide 19) This is a newer addition to the inventory. It is part of the SPEAR system of clothing. It is not as heavy as the bear suit, though with the overalls worn it is also a very warm garment and soldiers conducting more vigorous movements should be cautious of overheating.

ECWCS: Intermediate (Insulating) Layer

Designed to trap air, providing an insulating space of warm air

Consists of:

Pile Jacket (SPEAR LEP) – Shirt and

Medium Weight Stretch Bib Overalls (SPEAR LEP) - Overalls

Learning Step/Activity 4 – The Outer (Protection/Ventilation) Layer

a. (Slide 20) The Outer Layer is designed to provide protection from the elements and ventilation when necessary.

Uniform tips:

- Never change the configuration of the balaclava during PT. Anticipate the configuration that will work best for the activity. This will come with experience. If you start with it down, leave it down; changing the configuration exposes sweat soaked skin to the cold air and is the cause of many of the frostbite cases in USARAK.
- Black Vapor Barrier Boots are rated to -20 degrees F and are for use in Cold Wet Environments. These are no longer issued in Alaska.
- White VB boots are rated -20 F to -60 F and are for use in cold dry environments.
- The ICW boot is rated from 68 F to 10 F. Some tests have been conducted with the boot down to -10 F. There is a fine line in between the point at which soldiers should switch from the ICW to the VB boot. The USARAK 385-4, Risk Management for Cold Weather Operations gives guidelines based on temperature zones. Temperature zone III 9 F to -19 F is a good time to switch to VB boots. It must be stressed that this is dependent on workload and that leaders should ensure that both pairs of boots are available to soldiers in the event of a temperature swing or change of mission. This will give maximum flexibility.
- Wipe VB boots out at least once daily and change socks at the same time. Damp socks can be worn close to the body (between the inner and intermediate layer) to dry or can be placed in the sleeping bag to dry out overnight. Larger items that have become wet should not be placed in the sleeping bag. Instead place them between the sleeping bag and sleeping mat. Another option for very wet clothing is to allow it to freeze and then hit the garment against a tree or other hard object to remove the ice.
- Soldiers should not touch metal objects with bare skin. A contact glove should be worn while conducting work that requires more dexterity. Fuels do not freeze and will be the same temperature as the air. Soldiers must wear approved POL handling gloves to prevent frostbite while handling fuel.
- Routine tasks such as putting up shelters/stoves should be rehearsed while wearing Trigger Finger Mittens and Arctic Mittens.
- Wash GORTEX in powder detergent – liquid detergent will clog the pores of GORTEX and render it useless. Over time the water repellent qualities of GORTEX will be degraded by washing and normal use. There are products and procedures that can help restore the water repellent qualities of GORTEX. Some post laundry facilities will do this for you. 24 8 oz bottles NSN 8030-01-408-9446 Cost $102.91. Post Laundry can get in 5 gallons NSN 8030-01-408-9444. 55-gallon drums are also available with NSN 8030-01-408-9455. Some commercially available products that are authorized for use are StormShield (877-330-8760), Protex 2000 (800-658-5958) or X-pel (800-652-2533). To treat with any of these products wash the GORTEX according to the label instructions. Then run the GORTEX through a wash cycle without any detergent to ensure that it is completely rinsed clean of any soap residue. Set the machine again to the wash cycle and set the temperature to warm. Fill the machine until the clothing is completely covered with water. Add the water repellent (two ounces for the parka or 3 ounces for parka and trousers) and continue the wash cycle until it is completed. Tumble dry the clothing on permanent press and at medium heat until dry.
- In the field dry rub clothing to clean it.
- Make every effort to dry out clothing as soon as possible so that it can be re-used when needed.

ECWCS: Outer (Protection and Ventilation) Layer

Designed to provide protection (wind proof and water resistance) and ventilation when necessary

Consists of:

Parka, Extended Cold Weather (Improve water repellent qualities of Parka with NSN 8030-01-408-9446)
Trousers, Extended Cold Weather
Vapor Barrier Boots (White)
Mitten Inserts, Cold Weather
Mitten Shells, Cold Weather (Trigger Finger)
Mitten Set, Extreme Cold Weather (Arctic Mitten)
Balaclava
Suspenders

ELO E

ACTION	Describe the sleep systems available to soldiers
CONDITION	In a classroom environment.
STANDARD	Describe the sleep systems available to soldiers IAW the NWTC Cold Weather or Mountain Operations Handbook

Learning Step/Activity 1 – Sleep Systems

a. (Slide 21) The Modular Sleep System (MSS) is designed for a temperature range of +30 F to -40 F. At the low end of this range a soldier will only be comfortable for about four hours of sleep. This system will replace all other sleep systems issued in the US Army.

Modular Sleep System

Designed for temperatures of +30ºF to -40ºF.

Consists of:

- **Compression Sack**
- **Patrol Bag (Green) (+30ºF used alone)**
- **Intermediate Cold Weather Bag (Black) (-10ºF used alone)**
- **Vapor Permeable Bivouac Cover**

Combination of Intermediate Cold Weather Bag and Patrol Bag is rated to -30ºF

Addition of Bivouac Cover brings temperature rating to -40ºF for 4 hours of sleep.

Total system weight approximately 7 pounds

21 *REV-010920*

b. (Slide 21) The Type II system is still being issued in USARAK, but will soon be replaced by the MSS.

SLEEP SYSTEMS

Bag, Sleeping, Type II, Extreme Cold (two bag system)

Temperature range +10ºF to -45ºF

Temperature rating to -45ºF if booties, sleeping hood and polypropylene underwear is worn

22

REV-010920

ELO F

ACTION	Demonstrate the proper wear of the ECWCS system
CONDITION	In a classroom environment.
STANDARD	Demonstrate the proper wear of the ECWCS system IAW the NWTC Cold Weather or Mountain Operations Handbook

Learning Step/Activity 1 – Demonstration of clothing wear

a. NOTE: The instructor will talk a demonstrator through the different layers of clothing and proper wear of each layer. The demonstrator will start with the inner layer and add items as indicated by the instructor.

SECTION IV **SUMMARY**

Check on Learning

a. What are the principles that were used to develop the ECWCS system?
The system must insulate, have the ability to layer and have the ability to ventilate.

b. What does the acronym COLD stand for?
Keep it CLEAN, avoid OVERDRESSING, wear it LOOSE and in LAYERS, and keep clothing DRY.

Review and Summarize Lesson

ACTION	Demonstrate knowledge of design principles, proper wear and maintenance procedures of clothing and equipment for cold weather/mountain operations
CONDITION	In a classroom environment.
STANDARD	Demonstrate knowledge of design principles, proper wear and maintenance procedures of clothing and equipment for cold weather/mountain operations IAW the NWTC Mountain or Cold Weather Operations Manual.

Transition to next lesson

As per NWTC training schedule; dependent upon course in conduct.

SECTION V	STUDENT EVALUATION
Testing Requirements	Students will be tested on their knowledge of clothing and equipment for cold weather and mountain operations during a one hour written examination at the conclusion of the course (Refer to training schedule for date/time of exam).
Feedback Requirement	Students will receive two opportunities to pass each event tested. Re-training will be conducted for students that fail the first iteration of testing.